REMARKS

The Office Action of January 28 and the Advisory Action of March 8, 2010, have been carefully studied. Claims 1-3 currently appear in this application. These claims define novel and unobvious subject matter under Sections 102 and 103 of 35 U.S.C., and therefore should be allowed. Applicant respectfully requests favorable reconsideration and formal allowance of the claims.

Claim Amendments

Claim 1 has been amended to insert the limitation, "efficiently absorbs visible radiation ranging from 400 nm to 550 nm in the violet to green region." Support for this amendment can be found in the specification as filed at page 5, lines 16-22.

Art Rejections

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hohsaka et al., US 2001/0044074 and Namba et al., US 6,071,072 and Sun et al., *The Imaging Science Journal*, **47(2)**: 113-117. 1999. The Examiner further cites Kasada et al., US 6,525,181, to deny the unexpected properties of the claimed cyanine dye.

This rejection is respectfully traversed.

(I) Citation of Kasada

The Examiner states in the Advisory Action that, as shown in Table 1 of Kasada, trimethine cyanine dyes having an azo metal complex anion always have a better decomposition point than corresponding trimethine cyanine dyes having a perchlorate anion, and that the results found for the trimethine cyanine dyes or Kasada would be expected to be the same for monomethine cyanine dyes. Based upon this reasoning, the Examiner alleges that one skilled in the art would have expected that the decomposition rate[1] of a monomethine cyanine dye having an azo metal complex anion would be greater than the corresponding monomethine cyanine dye having a perchlorate anion.

However, it is respectfully submitted that the Examiner's reasoning is untenable for the following reasons:

(a) The results concerning decomposition points shown in table 1 of Kasada are not for monomethine cyanine dyes, but rather for trimethine cyanine dyes.

(b) There is nothing in Kasada that teaches or suggests that the results for trimethine cyanine dyes can be applied to monomethine cyanine dyes.

(c) The Examiner has not provided any rationale for the position that the results for trimethine cyanine dyes can be applied to monomethine cyanine dyes.

[1] It appears that "decomposition rate" should be "residual dye rate."

It is respectfully submitted that the Examiner's reasoning is gleaned from the disclosure of the present application.

(II) What is disclosed in Kasada

What is actually disclosed in Kasada is as follows:

(A) A comparison of Chemical Formula 25 (azo metal complex anion) and Chemical Formula 23 (perchlorate anion), and a comparison of Chemical Formula 6 (azo metal complex anion) and Chemical Formula 12 (perchlorate anion) are shown in Table 1. This demonstrates that the decomposition point of trimethine cyanine dyes of Chemical Formulae 25 and 6 (which have an azo metal complex anion) is **about 5 to 61°C higher** than the decomposition point of trimethine cyanine dyes of Chemical Formulae 23 and 12 (which have a perchlorate anion).

(B) A comparison of Chemical Formula 27 (azo metal complex anion) and Chemical Formula 23 (perchlorate anion) in Table 1 of Kasada demonstrates that the decomposition point of the trimethine cyanine dye of Chemical Formula 27 (having an azo metal complex anion) is 9.5°C lower than that of the trimethine cyanine dye of Chemical Formula 23 (having a perchlorate anion).

(C) A comparison of the decomposition points of Chemical Formulae 4, 5 and 6 demonstrates that the trimethine cyanine dye having a PF_6^- anion, that of Chemical Formula 4, has the highest decomposition point, which is

11.3°C higher than that of Chemical Formula 6, which has an azo metal complex anion.

Therefore, all that can reasonably be deduced from the disclosure (A) to (C) above in Kasada, is that some of the trimethine cyanine dyes having an azo metal complex anion show a higher decomposition point than trimethine cyanine dyes having a perchlorate anion, while others show a lower decomposition point than trimethine cyanine dyes having a perchlorate anion. In short, there is no direct relationship between the decomposition point and the types of anions in trimethine cyanine dyes. It should also be appreciated that Kasada only discloses trimethine cyanine dyes.

From the above, it is clear that one skilled in the art would not expect from the disclosure of Kasada that a monomethine cyanine dye having an azo metal complex anion would have a higher decomposition point that a monomethine cyanine dye having a perchlorate anion.

(III) Features of the Herein Claimed Invention

On pages 2 and 3, the present specification states that an object of the present invention is to provide a novel organic compounds which absorb visible light of a relatively short wavelength, have superior optical resistance and solubility in solvents, and have optical properties required in various fields using organic compounds. The present invention attained this object by providing monomethine cyanine dyes having an azo metal complex anion as recited in claim 1.

Contrary to what is claimed herein, Kasada and Hohsaka disclose trimethine cyanine dyes, which are not the same as monomethine cyanine dyes.

Sun discloses a monomethine cyanine dye having a perchlorate anion (compound D-1), trimethine cyanine dye (compounds D-2), pentamethine cyanine dye (compound D-3) and heptamethine cyanine dye (compound D-4).

Namba discloses cyanine dye having a benzene dithiol metal complex anion.

It is respectfully submitted that there is nothing in the combination of Kasada, Hohsaka, Sun or Namba that suggests the herein claimed monomethine cyanine dyes having an azo metal complex anion.

Sun states at page 114, right column, second paragraph, as follows:

> For dye 1, no significant change in the absorption spectrum was observers after it was irradiated under a **100W Exnphoto lamp for several hours**, although it was still purged with O_2 during the irradiation period. This indicates that **the photostability of dye 1 is very high. It no longer needs any stabilizers if it is used as a recording medium**. [emphasis added]

That is, Sun recognizes that a monomethine cyanine dye having a perchlorate anion, dye 1, compound D-1, is sufficiently photostable that is does not need stabilizers. It is therefore clear that Sun sees no requirement for improving the optical resistance of the monomethine cyanine dye. One can suppose that Sun did not recognize the necessity for improving the optical resistance of the monomethine dye because Sun did not actually apply the dye to optical devices in use today, since Sun was published in 1999.

In this regard, there is nothing in Sun that would lead one skilled in the art to improve the optical resistance of a monomethine dye by replacing the perchlorate anion with any other anion.

As in Sun, there is nothing in either Hohsaka, Namba or Kasada, either together or separately, that would lead one skilled in the art to improve the optical resistance of monomethine dyes having a perchlorate anion by replacing the anion with any other more suitable anion.

(IV) Unexpected advantageous effects of the herein claimed invention

The present inventors recognized that the insufficient optical resistance of conventional mononomethine cyanine dyes (i.e., Chemical Formula 14) is remarkably improved by using an azo metal complex anion as in the herein claimed monomethine cyanine dyes, such as those in Chemical Formulae 1 to 9. The residual dye rate, which is a parameter representing optical resistance, of the herein claimed monomethine cyanine dyes, is 99.3% or more, which is about three times as high as the residual dye rate, 29.3%, of the conventional monomethine cyanine dyes as exemplified by Chemical Formula 14. That is, replacing the perchlorate anion with an azo metal complex anion makes the optical resistance of a monomethine cyanine dye three times higher. This is quite unexpected, and there is no indication in any of the cited references that this substitution would so greatly increase the optical resistance of a monomethine cyanine dye.

(IV) Optical Resistance Test

The present specification describes optical resistance tests at pages 23-26. While the residual dye rates (%) after 5.5 hours of exposure are shown in Table 1 on page 24, the absorbance rates were measured after 0, 3.5 and 5.5 hours of exposure ay a wide range of wavelengths. The following figures are prepared from the absorbance rate data obtained in the test.

FIGURE 1

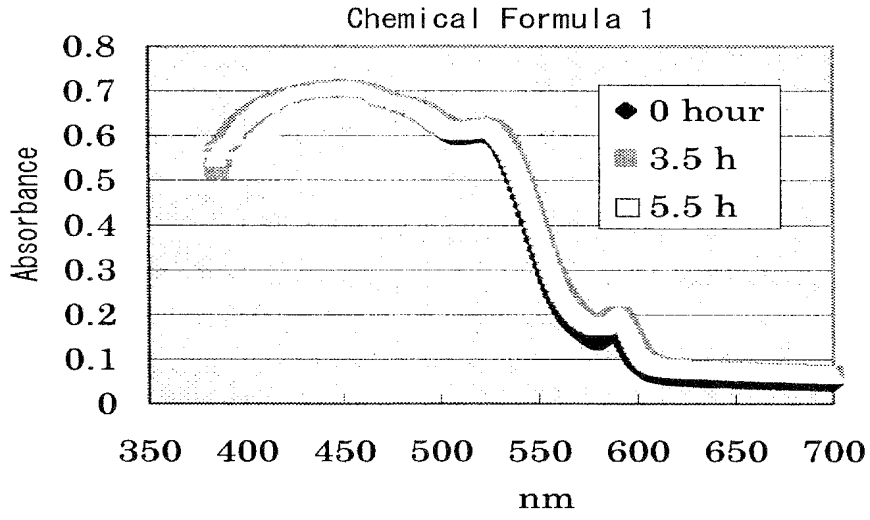
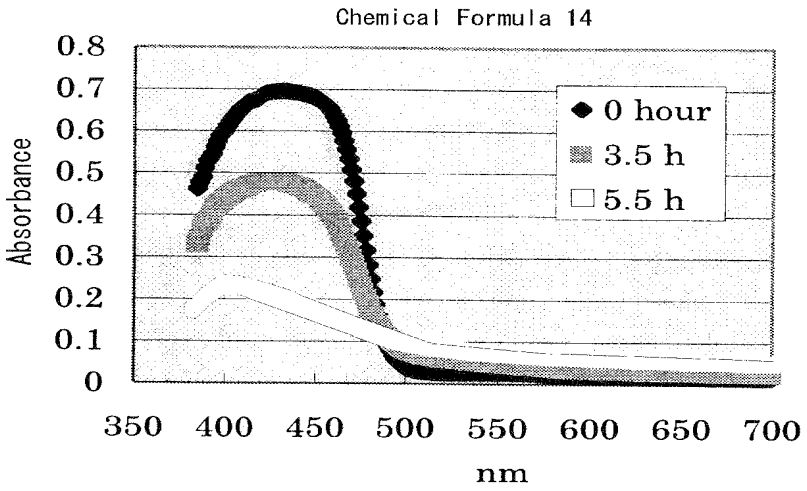


FIGURE 2



As shown in Figure 2, the conventional monomethine cyanine dye (Chemical Formula 14) absorbs light in a wavelength range from about 4500 nm to about 475 nm. This dye does not substantially absorb light of a wavelength over 500 nm.

In contrast thereto, Figure 1 shows that the herein claimed monomethine cyanine dye (Chemical Formula 1) absorbs light with a wider range of wavelengths, i.e., ranging from about 500 nm to about 550 nm in the violet to green region. This is another important feature of the herein claimed dyes.

Furthermore, as shown in Figure 2, the absorbance rate of the conventional monomethine cyanine dye (Chemical Formula 14) decreases from about 0.7 to about 0.25 when exposed to a xenon lamp for 5.5 hours.

Contrary to this, as shown in Figure 1, the absorbance rate of the herein claimed monomethine cyanine dye (Chemical Formula 1) remains about 0.7 even after 5.5 hours of exposure to a xenon lamp.

As noted above, the herein claimed cyanine dyes having an azo metal complex anion exhibit optical resistance three times as high as conventional monomethine cyanine dyes having a perchlorate anion.

There is nothing in any of Hohsaka, Sun, Namba, or Kasada that would lead one skilled in the art to the herein claimed monomethine cyanine dyes. Since Sun teaches that the monomethine cyanine dyes have sufficient optical stability that no stabilizers are necessary, it is clear that Sun sees no reason to change the monomethine dyes disclosed therein to obtain greater stability. There is nothing in any of Hohsaka, Namba or Kasada that would suggest preparing a monomethine cyanine dye with an azo metal complex anion. In view of the above, it is respectfully submitted that the claims are now in condition for allowance, and favorable action thereon is earnestly solicited.

Respectfully submitted,

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